THE NATIONAL ACADEMIES
DIVISION ON EARTH AND LIFE STUDIES
BOARD ON EARTH SCIENCES AND RESOURCES

COMMITTEE ON SEISMOLOGY AND GEODYNAMICS

Award Number 06HQAG0122

Final Technical Report
May 1, 2006 to April 30, 2008

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Two meetings of the Committee on Seismology and Geodynamics (COSG) were held during the award period—on October 11-12, 2006 and September 4-5, 2007, both in Washington D.C. The committee intended to hold an additional meeting during the first half of 2007; however, a delay in receipt of funds from committee sponsors meant that this was not possible.

Committee members spent part of one day during the October 2006 meeting at the offices of NASA, one of the committee's sponsoring agencies, to provide NASA personnel with an opportunity to give more in-depth briefings than is usually the case during standard meetings. Another prime motivation for this visit was to focus attention on the study on *National Requirements for Precision Geodetic Infrastructure,* and representatives from the agencies that provided funding for the study briefed COSG members on their hopes and expectations. Additional details on this study are provided below. The committee hopes to visit the USGS offices in Pasadena during its next meeting in Irvine, with this same objective to meet and discuss a broad range of issues with agency personnel. Agency visits during earlier COSG meetings were to DOE-Office of Science and the National Science Foundation.

The remainder of this October 2006 meeting was held at the Keck Center facility, where committee members received briefings on international seismology activities and seismology instrumentation issues from IRIS (see agenda below), with a view to attempting to determine whether there might be some role that the committee could play to alleviate anticipated future problems in this area.

The September 2007 meeting focused on presentations and commentary from sponsoring agencies—USGS, NSF, and DOE—concerning their activities and programs (see agenda below). The committee also spent some time discussing the upcoming Geodetic Networks study, and provided input on potential committee members.

With continued support from government agencies, the COSG will be able to provide advice to scientific groups working on seismological and geodynamic issues both inside and outside the federal government.

STATEMENT OF TASK

The Statement of Task for the COSG is to:

1. Foster and encourage understanding of the structure, dynamics and evolution of the Earth.
2. Review and define basic and applied research activities in seismology, geodesy and geodynamics that contribute to federal agency missions.
3. Address the transfer of seismological and geodynamics knowledge to areas of public welfare and national need including topics such as earthquake science; geological hazards; energy, mineral, and water resources; national security; global climate change; land-use planning; and public education.
4. Foster long-term national efforts to collect, store and openly disseminate seismological, geodetic, and geodynamical data of all types.
5. Foster long-term national efforts to monitor geodynamical events as well as nuclear testing treaties using geophysical technologies.
6. Serve as the U.S. member of the Inter-Union Commission on the Lithosphere.

PRESENT OVERSIGHT ACTIVITY

National Requirements for Precision Geodetic Infrastructure
The COSG is the oversight body for an ad hoc study to address the following statement of task:

> Improvements in positioning, navigation, and timing have always driven exploration and understanding of our world. Recognizing the national importance of maintaining and improving the global, high precision geodetic infrastructure that is fundamental to scientific discovery and leadership, and their applications to societal well-being and a vast array of commercial activity, an NRC committee will:
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> - Describe and assess the range of benefits to the nation that are dependent on high precision geodetic networks;
> - Review high priority scientific objectives that are dependent on geodetic networks;
> - Describe the infrastructure requirements for achieving these objectives and benefits;
> - Assess the opportunities for technological innovation that will arise from renewed investment in geodetic infrastructure;

- Recommend a national plan for the implementation of a precision geodetic infrastructure.

No budgetary recommendations will be made.

Funding for this activity has been provided by USGS, NSF-Division of Earth Sciences, NASA, NOAA-National Geodetic Survey, DoD-U.S. Naval Observatory, and DoD-National Geospatial-Intelligence Agency. After a broad call for committee nominations as soon as sufficient funding was received, the study committee was appointed in February 2008. The committee has held two meetings—in Washington, D.C, on April 6-8, 2008, to receive briefings from federal agencies, and in Boulder, CO, on June 11-13, 2008, to receive briefings on a broad range of technical subjects addressing the committee's charge. Two further meetings are planned, in Irvine, CA, on September 11-13, 2008, and in Austin, TX, on November 19-21, 2008. At this stage we anticipate that both these upcoming meetings will be entirely closed session meetings so that the committee can continue their deliberations and finalize their report. The study is expected to be completed in early 2009, when the committee's report is released.

MEMBERSHIP OF THE COMMITTEE ON SEISMOLOGY AND GEODYNAMICS

Although committee membership was relatively stable during this award period, a number of committee rotations at the end of 2006 will result in significant change in the future. Committee membership during the 2006-2008 period was:

Present Members:

Louise H. Kellogg, *Chair,* Professor of Geology and Department Chair, University of California, Davis (term expires 12/31/2009).

Michael E. Wysession, *Vice-Chair,* Professor of Geophysics, Department of Earth and Planetary Sciences, Washington University, St. Louis, MO (term expires 12/31/2009).

Emily E. Brodsky, Associate Professor of Geophysics, Department of Earth and Space Sciences, University of California, Santa Cruz (term expires 12/31/2008).

James L. Davis, Geodesist and Group Leader, Space Geodesy Group, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA (term expires 12/31/2008).

Adam M. Dziewonski, NAS, Frank B. Baird, Jr. Professor of Science, Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA (term expires 12/31/2008).

William E. Holt, Professor, Department of Geosciences, State University of New York at Stony Brook (term expires 12/31/2008).

M. Meghan Miller, Central Washington University, Ellensburg, Washington (term expires 12/31/2009).

Nancy L. Ross, Professor of Mineralogy, Department of Geosciences, Virginia Polytechnic Institute and State University, Blacksburg (term expires 12/31/2009).

Charlotte A. Rowe, Seismologist, Los Alamos National Laboratory, NM (term expires 12/31/2009).

Brian W. Stump, Professor of Geological Sciences, Department of Geological Sciences, Southern Methodist University, Dallas, TX (term expires 12/31/2009).

Aaron A. Velasco, Associate Professor, Department of Geological Sciences, University of Texas at El Paso (term expires 12/31/2008).

Former Members (terms expired):

Terry C. Wallace, Jr., *Chair*, Principal Associate Director of Science, Technology, and Engineering, Los Alamos National Laboratory, New Mexico (term expired 12/31/2006).

Alan Levander, *Vice-Chair*, Chair of the Department of Geosciences, Rice University, Houston, Texas (term expired 12/31/2006).

Jack R. Murphy, Chief Scientist, Defense Technology Group, Science Applications International Corporation, Arlington, Virginia (term expired 12/31/2006).

Ru-Shan Wu, Research Geologist, Theoretical Seismology and Geophysical Imaging University of California, Santa Cruz (term expired 12/31/2006).

Attachment

BOARD ON EARTH SCIENCES AND RESOURCES

Committee on Seismology and Geodynamics

October 11-12, 2006

Agenda

Wednesday, October 11, 2006

CLOSED SESSION

8.00 am to 1.00 pm

OPEN SESSION

NASA Headquarters, Room 3P44
300 E Street, SW
Washington, DC 20546

PROGRAM ACTIVITIES

1.00	Introductions	*Terry Wallace*
1.15	NASA - Organization	*Lucia Tsaoussi*
1.30	NASA Solid Earth Program – Activities and Plans	*John LaBrecque*
2.00	Discussion - Potential requests for advice	*Terry Wallace*
3.00-3.30	Break	

STUDY - SUPPORT FOR NATIONAL GEODETIC NETWORK INFRASTRUCTURE

3.30	Introduction – status of the study	*David Feary*
3.45	Discussion - Agency Perspectives and Expectations	*John LaBrecque (NASA)*
		Jim Whitcomb (NSF)
		Ken Hudnut and Mike Blanpied (USGS)
		Jim Slater (DoD-NGA)
		Dennis McCarthy (DoD-USNO)
		Richard Snay and Giovanni Sella (NOAA-NGS)
5.00	Adjourn	

BOARD ON EARTH SCIENCES AND RESOURCES

Committee on Seismology and Geodynamics

The National Academies Building, Room 205
500 Fifth Street, NW
Washington, DC 20001

October 11-12, 2006

Thursday, October 12, 2006

OPEN SESSION

8.00 am Continental Breakfast in the Meeting Room

COSG - FUTURE ACTIVITIES

8.30	Welcome and Introductions	*Terry Wallace*
8.45	Seismographic Instrumentation Issues	*Ray Willemann IRIS*
9.00	Committee Discussion	*Terry Wallace*
10.15-10.45	Break	
10.45	International Seismology Activities	*Ray Willemann IRIS*
11.00	Committee Discussion	*Terry Wallace*
12.00-1.30	Lunch	

CLOSED SESSION

1.30 pm to 4.30 pm

Attachment

BOARD ON EARTH SCIENCES AND RESOURCES

Committee on Seismology and Geodynamics

The National Academies Building, Room 101
500 Fifth Street, NW
Washington, DC 20001

September 4-5, 2007

Tuesday, September 4, 2007

CLOSED SESSION

8.00 am to 11.30 am

OPEN SESSION

11.30-12.30 Lunch

AGENCY PROGRAM ACTIVITIES

12.30	Introductions	*Louise Kellogg*
12.45	USGS Earthquake Hazards Program - status and future plans	*David Applegate*
1.15	NSF Cyberinfrastructure - status and future plans	*David Lambert*
1.45	EarthScope - status and future plans	*Kaye Shedlock*
2.15	NSF Deep Earth Processes - status and future plans	*Jim Whitcomb*
2.45	Discussion - Potential requests for advice	*Louise Kellogg*
3.00-3.30	Break	
3.30	DOE-BES - status and future plans	*Nick Woodward*
4.15	Discussion - Support for Geologic Sequestration Science	*Louise Kellogg*
5.00	Adjourn	

Wednesday, September 5, 2007

CLOSED SESSION

8.00 am to 4.30 pm